so that a much better fit was obtained. This modification is here called the *Schlenker retention function.* This modification made essentially no change in the whole-body retention predictions of the function, but it changed the distribution of radium between soft tissues and bone.

Somewhat later Rundo et al. (1985), Keane and Schlenker (1987), and Keane et al. (1988) analyzed the long-term retention of radium after low-level radium exposure and observed that 30-60 years after acquisition, these subjects lost radium more rapidly than predicted by the ICRP 20 retention function. Rowland (1993) examined their data and the predictions of the ICRP 20 function and pointed out a contradiction. This retention function contains the quantity λ, the rate of apposition and resorption in compact bone, which is defined in the ICRP (1973) publication as 2.5% per year. The ICRP (1973) document states that this quantity is a property of bone itself rather than a property of one of the radioelements in bone. Nevertheless, when the parameters were defined for the retention of radium, 1.5% per year was employed for λ. This value was used to fit the retention function to the Elgin cases, who received injections of radium sufficiently large to induce several malignancies.

Rowland (1993) changed the parameters of the Schlenker retention function to retain the distribution between soft tissue and bone and yet incorporate the higher bone turnover rate. This modification resulted in a retention function that closely parallels the ICRP 20 model for the first five years, then predicts a slightly more rapid loss that fits the observed data for radium cases with initial systemic intakes of less than 30 μCi of ^{226}Ra, as calculated previously by the Norris function.

Figure 9 illustrates the retention predictions of the Norris function, the ICRP 20 function, and the modification obtained by changing the value of λ from 1.5% per year to the more appropriate value of 2.5% per year. Figure 9 shows the fractional retention predicted by each of these retention functions from 1 year to 70 years after a single injection of radium, neglecting radioactive decay. The differences are not great, but it must be remembered that the body contents of all the radium subjects were measured many years after exposure. Stehney et al. (1978) stated that the average date of first measurement for the early dial painters was some 40 years after initial exposure to radium. Both the total dose and the initial systemic intake are calculated by first extrapolating back along the retention curve to the body content at day one. In the past, all such extrapolation was by means of the Norris function. The values in this document have been obtained by extrapolating back along a retention curve appropriate to the body content. For the low-level cases, the "new" curve in Figure 9 will give a content at day